FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT | ($) 130.00

Complete if Known	
Application Number	10/643,624
Filing Date	August 18, 2003
First Named Inventor	MORI, Akihiro
Examiner Name	Unassigned
Art Unit	2186
Attorney Docket No.	16869K-090500US

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 20-1430

Deposit Account Name: Townsend and Townsend and Crew LLP

The Director is authorized to: *(check all that apply)*

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims		-** =		X		=	
Independent Claims		-** =		X		=	
Multiple Dependent				X		=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)0.00

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	130
1807	50	1807	50	Petitions related to provisional applications	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) ----------

*Reduced by Basic Filing Fee Paid **SUBTOTAL (3)** ($)130.00

SUBMITTED BY *Complete (if applicable)*

Name (Print/Type)	Chun-Pok Leung	Registration No. (Attorney/Agent)	41,405	Telephone	650-326-2400
Signature				Date	September 10, 2004

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60305912 v1

PATENT
Attorney Docket No.: 16869K-090500US
Client Ref. No.: 630/SM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

AKIHIRO MORI

Application No.: 10/643,624

Filed: August 18, 2003

For: STORAGE SYSTEM, STORAGE SYSTEM CONTROL METHOD, AND STORAGE MEDIUM HAVING PROGRAM RECORDED THEREON

Customer No.: 20350

Examiner: Unassigned

Technology Center/Art Unit: 2186

Confirmation No.: 4459

PETITION TO MAKE SPECIAL FOR NEW APPLICATION UNDER M.P.E.P. § 708.02, VIII & 37 C.F.R. § 1.102(d)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a petition to make special the above-identified application under MPEP § 708.02, VIII & 37 C.F.R. § 1.102(d). The application has not received any examination by an Examiner.

(a) The Commissioner is authorized to charge the petition fee of $130 under 37 C.F.R. § 1.17(i) and any other fees associated with this paper to Deposit Account 20-1430.

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(b) All the claims are believed to be directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then Applicants will make an election without traverse as a prerequisite to the grant of special status.

(c) Pre-examination searches were made of U.S. issued patents, including a classification search and a computer database search. The searches were performed on or around July 16, 2004, and were conducted by a professional search firm, Kramer & Amado, P.C. The classification search covered Classes 711 (subclasses 114, 161, and 162) and 707 (subclass 204). The computer database search was conducted on the USPTO systems EAST and WEST. The inventors further provided two references considered most closely related to the subject matter of the present application (see references #6 and #7 below), which were cited in the Information Disclosure Statement filed with the application on August 18, 2003.

(d) The following references, copies of which are attached herewith, are deemed most closely related to the subject matter encompassed by the claims:

(1) U.S. Patent No. 6,119,131;
(2) U.S. Patent No. 6,216,202 B1;
(3) U.S. Patent No. 6,557,089 B1;
(4) U.S. Patent No. 6,631,477 B1;
(5) U.S. Patent No. 6,681,303 B1;
(6) U.S. Patent No. 6,442,551 B1; and
(7) Japanese Patent Publication No. 2000-339104.

(e) Set forth below is a detailed discussion of references which points out with particularity how the claimed subject matter is distinguishable over the references.

A. Claimed Embodiments of the Present Invention

The claimed embodiments relate to a method of controlling a storage system, and a storage medium having a control program recorded thereon.

Independent claim 1 recites a method of controlling a storage system. The storage system includes a host computer, and a storage control device that is connected to the host computer to be able to communicate therewith and that is for inputting/outputting data to/from a storage device based on a data input/output request sent from the host computer. The storage control device performs: a first control for managing a storage area in the storage device using a logical volume that is a logical storage area created on the storage area and storing, in the logical volume, management information that enables an operating system running on the host computer to manage the logical volume; a second control for controlling duplication of data in a first logical volume also to be stored on a real-time basis in a second logical volume that is different from the first logical volume; and a third control for making a logical volume identifier and a data set identifier for the first logical volume that are described in the management information in the first logical volume and a logical volume identifier and a data set identifier for the second logical volume that are described in the management information in the second logical volume match each other while the real-time duplication is being performed. The method comprises generating by the storage system a control program for performing a process for setting the logical volume identifier and the data set identifier for the first logical volume, which are described in the management information in the first logical volume, and the logical volume identifier and the data set identifier for the second logical volume, which are described in the management information in the second logical volume, to be different from each other; and interrupting by the storage system the duplication and then executing the control program.

Independent claim 9 recites a storage system comprising a host computer; and a storage control device that is connected to the host computer to be able to communicate therewith and that is for inputting/outputting data to/from a storage device based on a data input/output request sent from the host computer. The storage system manages a storage area provided by the storage device using a logical volume that is a logical storage area created on the storage area; stores, in the logical volume, management information that enables an operating system running on the host computer to manage the logical volume; controls duplication of data in a first logical volume also to be stored on a real-time basis in a second logical volume that is different from the first logical volume; and makes a logical volume identifier and a data set identifier for the first logical volume that are described in the

management information in the first logical volume and a logical volume identifier and a data set identifier for the second logical volume that are described in the management information in the second logical volume match each other while the real-time duplication is being performed. The storage system further comprises means for generating a control program for performing a process for setting the logical volume identifier and the data set identifier for the first logical volume, which are described in the management information in the first logical volume, and the logical volume identifier and the data set identifier for the second logical volume, which are described in the management information in the second logical volume, to be different from each other; and means for executing the control program after interrupting the real-time duplication to make the second logical volume be recognized as being accessible by the operating system either as a logical volume independent of the first logical volume or as a data set independent of a data set within the primary logical volume.

Independent claim 10 recites a computer-readable storage medium having a program to be executed by a storage system recorded thereon. The storage system includes a host computer; and a storage control device that is connected to the host computer to be able to communicate therewith and that is for inputting/outputting data to/from a storage device based on a data input/output request sent from the host computer. The storage system manages a storage area provided by the storage device using a logical volume that is a logical storage area created on the storage area; stores, in the logical volume, management information that enables an operating system running on the host computer to manage the logical volume; controls duplication of data in a first logical volume also to be stored on a real-time basis in a second logical volume that is different from the first logical volume; and makes a logical volume identifier and a data set identifier for the first logical volume that are described in the management information in the first logical volume and a logical volume identifier and a data set identifier for the second logical volume that are described in the management information in the second logical volume match each other while the real-time duplication is being performed. The program comprises code for performing a process for setting the logical volume identifier and the data set identifier for the first logical volume, which are described in the management information in the first logical volume, and the logical volume identifier and the data set identifier for the second logical volume, which are described in the management information in the second logical volume, to be different from

each other, after interrupting the duplication to make the second logical volume be recognized as being accessible by the operating system as a logical volume independent of the first logical volume.

One benefit that may be derived is improved efficiency and accuracy in setting the logical volume identifier and the data set identifier during duplication phase involving real-time duplication and when the duplication phase is interrupted. In previous approaches, the volume names and data set names are described in a number of locations in the management information. It is very cumbersome to perform settings for each data by using an editor, a tool, etc., and in addition, human error may occur during the setting procedure. It is not practical to perform setting for volume identifiers and data set identifiers every time a routine job, such as a daily data backup, a daily batch processing, and data analysis, is performed at a regular or irregular interval. See specification at page 4, lines 5-22. The present embodiments avoids this problem.

B. Discussion of the References

None of the following references disclose or suggest making a logical volume identifier and a data set identifier for a first logical volume that are described in the management information in the first logical volume and a logical volume identifier and a data set identifier for the second logical volume that are described in the management information in the second logical volume match each other while the real-time duplication is being performed, and setting the logical volume identifier and the data set identifier for the first logical volume and the logical volume identifier and the data set identifier for the second logical volume to be different from each other after interrupting the duplication.

1. U.S. Patent No. 6,119,131

This reference discloses storing information regarding volume mount points hosted by a logical volume on the physical device underlying the logical volume so that the relationships between the host logical volume and target logical volumes mounted on the volume mount points can be reconstituted when the system containing the logical volumes is rebooted, when the underlying physical devices are moved with the system, and when the logical volumes are transported to a different system. In one example, the partition

comprising a logical volume can change without deleting the volume if the logical volume is a mirrored volume that has been broken or a striped set that has been rebuilt. Under such circumstances, the device name does not change, but the unique volume identifier associated with the logical volume does change.

2. U.S. Patent No. 6,216,202 B1

This reference discloses a method and an apparatus for managing a plurality of logical volumes in a computer system. The method combines at least two logical volumes into a single logical volume (virtual volume), presents the virtual volume as a single logical volume to the computer, and presents information to the computer with information that allows the computer to deconstruct the virtual volume into the at least two logical volumes.

3. U.S. Patent No. 6,557,089 B1

This reference discloses a backup system that suppresses the volume ID of the source volume, and then creates a backup volume and reintroduces the source volume ID. The system differentiates volume IDs during an intermediate copy step.

4. U.S. Patent No. 6,631,477 B1

This reference discloses a host system for mass storage. The host system manipulates volume IDs to make backup copies and restore logical volumes.

5. U.S. Patent No. 6,681,303 B1

This reference discloses a storage system that assigns a logical volume (T) upon receipt of a remote pair request for copying the logical volume (S) of the source volume.

6. U.S. Patent No. 6,442,551 B1

This reference relates to a data network with data storage facilities for providing redundant data storage and for enabling concurrent access to the data for multiple purposes. A first data processing system has a first data facility; while a second data storage facility mirrors the data in the first data storage facility. In a concurrent access operating mode, the second data storage facility make the data available to an application concurrently

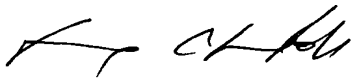
with, but independently of, the operation of the other application. On completion of the concurrent operation, the second data storage facility can reconnect with and synchronize with the first data storage facility thereby to reestablish the mirroring operation.

7. Japanese Patent Publication No. 2000-339104

This reference relates to a disk subsystem and a data copying method to generate the copy of a logical volume without a host channel by changing a logic address of data on a regular volume which is read into the logic address of an auxiliary volume and transferring it to the auxiliary volume. A controller 102 gives the instruction of a copy of data on a cache 107 to a hardware of a DRR 1082. The controller 102 secures an area for placing the copy on the cache 107. A processor 1081 of a DKA 108 reads objective data (data of the regular volume) which is read to the cache 107 to a buffer 108 in the DRR 1081. The regular address of data which is read is changed to a volume number which is set when a new pair generation command is issued by using the DRR 1082. A check code is also changed by adjusting it to the changed volume number. Data whose logic address is changed is transferred to an area for auxiliary volume in the cache 107.

(f) In view of this petition, the Examiner is respectfully requested to issue a first Office Action at an early date.

Respectfully submitted,



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